Corporate Affairs Canada | Consommation et Corporations Canada

(11) (A) 1 260 653

(45) ISSUED 890926

(52) CLASS 6-161
C.R. CL. 94-52;
117-176; 204-189

(51) INT. CL.[4] C08L 95/00

(19) (CA) CANADIAN PATENT (12)

(54) Modified Asphalt

(72) Janicki, Richard T.,
U.S.A.

(73) Granted to Owens-Corning Fiberglas Corporation
U.S.A.

(21) APPLICATION No. 487,819

(22) FILED 850730

(30) PRIORITY DATE (US) U.S.A. (722,245) 850411

No. OF CLAIMS 21

Canada

DISTRIBUTED BY THE PATENT OFFICE OTTAWA
CCA-274 (11-82)

This invention pertains to modified asphalts.

In one of its more specific aspects, this invention pertains to asphalts modified with synthetic waxes to form compositions particularly suitable as coatings and saturants.

It is well known in the art of roofing shingle production, to employ asphalt-based compositions as saturants on base materials such as felt, glass fibers, asbestos and the like. As extenders, it is customary to include in the coating certain filler materials which increase the quantity of material saturatable by the asphalt, which materials act to absorb wear on the shingle. Such fillers, however, at to increase the viscosity of the asphalt making it less penetratable of the base materials and requiring that the application of the asphalt to the base materials be made at higher temperatures to compensate for the increase in viscosity of the asphalt upon addition of the filler.

It is also well known in the art that various materials can be blended with asphalt to lower the viscosity at processing temperatures, thereby enabling easier processing. For example, in U.S. Patent 4,282,038, to Earing, gilsonite, a naturally occurring asphalt, is modified by the addition of a process oil to reduce the viscosity of the asphalt during processing. It is also known to add waxes to asphalt to provide viscosity control and improve shape retention of asphalt articles at elevated temperatures. For example, U.S. Patent 3,808,164 to Gulino et al teaches the use of dozens of materials to be blended with asphalt to reinforce the asphalt material and help retain its shape.

One of the problems with commonly employed materials for blending with asphalts is that those materials seeking to reduce the viscosity for processing purposes leave the asphalt too soft for practical operation as a product. Also, those additives which make the asphalt harder during temperatures normally encountered in the use of the asphalts tend to make the asphalt too viscous for acceptable processing.

This invention is directed to the solution of that problem by providing an asphalt blend which has an increased

softening point over typically blown coating asphalts, while having an acceptably low viscosity at elevated processing temperatures.

According to this invention there is provided a composition comprising a petroleum-derived asphalt and up to about 10 percent by weight of bis-stearoylamide.

Also, in accordance with this invention, there are provided compositions, including roofing shingles, comprising the asphalt and bis-stearoylamide composition.

In a preferred embodiment of the invention, the composition contains from about 2 to 6 percent by weight of the bis-stearoylamide.

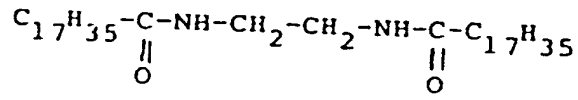
The accompanying drawing is a graph of viscosity versus temperature for a typically blown asphalt and for an asphalt blended with bis-stearoylamide according to the principles of the invention.

The invention is applicable to natural and petroleum-derived asphalts including straight-run fractionation-derived asphalts, cracked asphalts, asphalts derived from processing such as blown asphalts, propane deasphalting, steam distillation, chemically modified asphalts, and the like. In a preferred embodiment, the invention is applicable to asphalts for shingle production having a ring and ball softening point of about 143°F.

The bis-stearoylamide can be mixed with the asphalt in any amount suitable to reduce the viscosity of the asphalt to that viscosity desired for the ultimate blend. Generally, the bis-stearoylamide will be introduced into the asphalt in an amount up to about 10 percent by weight and preferably in an amount within the range of from about 2 to about 6 percent by weight of the blend of the two materials. The bis-stearoylamide can be introduced into the asphalt in any suitable manner, for example, as a solid into a solid or liquid, or as a liquid into a solid or liquid, the addition being made at any suitable temperature. The bis-stearoylamide can also be added in an amount sufficient to increase the softening point without significantly altering the viscosity

of the asphalt.

The bis-stearoylamide used in the invention preferably has a softening point greater than 260°F, and has the following chemical composition:



The final combination of bis-stearoylamide and asphalt can be diluted with any suitable diluent. Further, any combination of other materials such as aggregate asbestos, glass, and the like can be incorporated into the combination.

Application of the asphalt and bis-stearoylamide to the base material is made in the usual manner, with or without the addition of fillers.

It has been found that the addition of between 2 and 6 percent of bis-stearoylamide to asphalt greatly improves the weatherability of asphalt shingles. Although some slight improvement might have been expected, the improvement was so great that it exceeded any expectation. The term "weatherability" is a term that is well understood in the art as indicating durability or resistance to weather conditions. Webster's Third New International Dictionary defines "weatherability" as the "capability of withstanding weather".

The following Examples illustrate the invention.

EXAMPLES

Roofing shingles for weather testing were prepared by coating a conventional shingle base mat with control asphalt compositions (1) and (2). Composition (1) comprised coating grade asphalt and 52% filler while composition (2) comprised the same coating grade asphalt with 65% of the same filler as used in (1). Three specimen shingles were prepared using each of the asphalt coating compositions (1) and (2).

Specimen shingles were prepared in the same manner using asphalt coating compositions (3) and (4). Composition (3) comprised the coating grade asphalt, 3% Glyco Wax (bis-stearoylamide) and 65% filler while composition (4) comprised the coating grade asphalt, 3% Glyco Wax and 70% filler. Three specimen shingles were prepared using each of compositions (3) and (4).

The specimen shingles were then subjected to a standard weathering test with the following results, the indicated cycle ranges representing the greatest number of cycles recorded before failure had occurred:

24 Hour Cycles

Coating Composition	Specimen 1	2	3	Average
1	62.5- 65.4	62.5- 65.4	62.5- 65.4	64.0
2	55.2- 58.5	51.0- 55.0	55.2- 58.5	55.6
3	109.9-112.4	89.5- 92.9	97.0-100.0	100.3
4	112.4-119.5	119.5-121.5	112.4-119.5	117.5

The above results show that the bis-stearoylamide modified asphalt compositions (Nos. 3 and 4) improve the weatherability of roofing shingles substantially by approximately 100% before failure when compared with the conventional unmodified standards (Nos. 1 and 2). This remarkably improved weatherability could not have been predicted from the prior art and was unexpected.

It has been found that the composition of the invention greatly changes the viscosity/temperature curve as shown in the drawing. The solid line indicates the properties of a partially blown asphalt modified with 3 percent by weight bis-stearoylamide, the blend having 70 percent filler and a softening point of 225°F. The dashed line shows the properties of partially blown asphalt without the bis-stearoylamide modifier, but having 70 percent filler and a softening point of 170°F. The dotted line indicates

the properties of a fully blown, unmodified asphalt with 61 percent filler and a softening point of 225°F. As can be seen, the modification increases the softening point in the lower temperature ranges without significantly lowering the viscosity. Preferably, in the lower temperature ranges of from about 110°F to about 230°F the viscosity drops from about 9,000,000 poise to about 11,000 poise. Also, it can be seen from the drawing that the viscosity drops rapidly once an elevated temperature is reached. Preferably, in the elevated temperature range of from about 230°F to about 265°F, the viscosity drops from about 11,000 poise to about 325 poise.

The composition of this invention can be used for numerous applications. For example, the composition can be used to coat a fiberglass board having a density of from about 2 to about 12 pounds per cubic foot. Such boards are suitable for numerous proposes, including, without limitation, roof insulation boards and basement wall insulation boards. Another suitable use for the composition of the invention is in sacrificial electrical anodes used in cathodic protection devices.

Another improtant use for the composition of the invention is as an undersealer in a highway construction. A problem in the maintenance of highways is that the supporting soil beneath the highway becomes eroded underneath joints or cracks in the highway. In order to put back in place support for the highway, an asphalt undersealer is pumped into a position underneath the joint or crack.

Another important use of the composition of the invention is in treating or coating the surface, joints or cracks in pavements. Pavements are broadly defined as highways, bridge decks, parking lots, driveways, runways, etc. The increased softening point of the composition makes the composition tougher in the coating or surfacing application, while enabling a lower viscosity at processing temperatures for the addition of filler materials and other modifiers. The composition of this invention can also be used as an

adhesive and as a dust palliative. It is also suitable for use as a waterproofing material, particularly for use on basement walls.

The material is outstandingly adapted to forming a laminate by intimately bonding it to a flexible sheet-like support, for example, a thermoplastic film such as a polyamide, polyester or polyolefin.

The asphalt of the invention can be used as a pitch substitute for such uses as pipe coatings, board saturants, and the manufacture of clay pigeons.

The composition described herein, and the products made from that composition, result in a changing of the temperature/viscosity relationship in a way not expected by the inventor. This results in a greatly improved asphalt for numerous uses, including in particular, roofing applications. This results in a processing difference which enables the conversion of asphalts into coating grade asphalts with only a minor amount of blowing and mixing, rather than the extensive amount of blowing required in a typically blown asphalt.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A composition comprising a petroleum-derived asphalt and up to about 10 percent by weight of bis-steroyl-amide.

2. The composition of claim 1 in which said asphalt has a ring and ball softening point of about 143°F.

3. The composition of claim 1 or 2 in which the softening point of said bis-stearoylamide is greater than about 260°F.

4. The composition of claim 1 containing from about 2 to about 6 percent by weight of said bis-stearoylamide.

5. The composition of claim 4 in which the softening point is about 225°F and the viscosity drops from about 11,000 poise to about 325 poise at temperatures within the range of from about 230°F to about 265°F.

6. The composition of claim 4 in which the softening point is about 225°F and the viscosity drops from about 9,000,000 poise to about 11,000 poise at temperatures within the range of from about 110°F to about 230°F.

7. A fiberglas board having a density of from about 2 to about 12 pounds per cubic foot, the board being coated on at least one surface with a composition as defined in claim 4.

8. A sacrificial electrical anode for use in cathodic protection, the anode being coated with a composition as defined in claim 4.

9. A laminate formed by bonding a composition as defined in claim 4 to a flexible sheet-like support.

10. A waterproofing membrane formed of a composition as defined in claim 4.

11. A method of maintaining the viscosity of a petroleum-derived asphalt and increasing its softening point, which comprises blending into said asphalt up to about 10 percent by weight of bis-stearoylamide effective to increase the softening point while maintaining or reducing the viscosity of the asphalt.

12. The method of claim 11 in which said asphalt has a ring and ball softening point of about 143°F.

13. The method of claim 12 in which an amount of bis-stearoylamide within the range of from about 2 to about 6 percent by weight of the blend is employed in the blend.

14. The method of claim 11, 12 or 13 in which said bis-stearoylamide is introduced as a solid into the solid or liquid asphalt.

15. The method of claim 11, 12 or 13 in which said bis-stearoylamide is introduced as a liquid into the solid or liquid asphalt.

16. The method of claim 11, 12 or 13, in which a dilutant is added to the blend of asphalt and bis-stearoylamide.

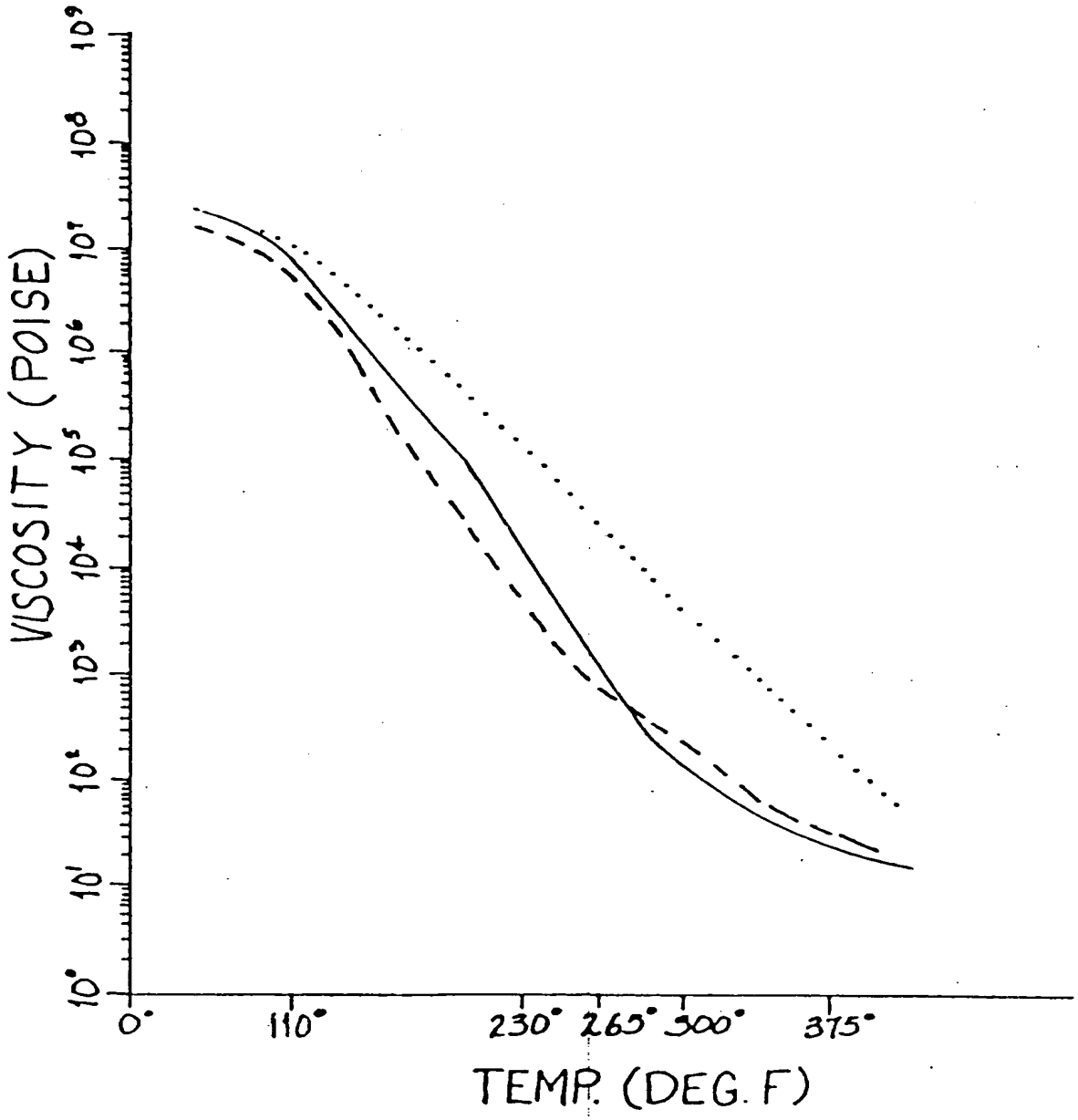
17. The method of claim 11, 12 or 13 in which a material selected from the group consisting of aggregate, asbestos and glass is added to the blend of asphalt and bis-stearoylamide.

18. A roofing product formed of a composition comprising an asphalt and bis-stearoylamide, the bis-stearoylamide improving the weatherability of the product.

19. In a roofing composition comprising asphalt, the improvement which comprises incorporating bis-stearoylamide in the composition in an amount sufficient to provide improved weatherability.

20. The composition of claim 19, containing from about 2 to about 6 percent by weight of said bis-stearoylamide.

21. A roofing product according to claim 18, which is a roofing shingle.


VISCOSITY (POISE)
10⁰
10¹
10²
10³
10⁴
10⁵
10⁶
10⁷
10⁸
10⁹
0°
110°
230°
265°
300°
375°
TEMP. (DEG. F)

BELL & [illegible]KIN